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Art. XIII.—*On the Flanged Cowry, Palliocypraea gastroplax.*

By FREDK. CHAPMAN, A.L.S., F.G.S., etc.

(With Plates XIX., XX.)

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Occurrence of Specimen.

The remarkable cowry described by the late Professor Sir Frederick McCoy, under the name of *Cypraea gastroplax* (McCoy, 1875, p. 20, pl. xvi., fig. 1; pl. xvii.; pl. xviii., fig. 2), remained a unique specimen, so far as the National Museum collection is concerned, until the subject of this note was found by Mr. Walter Greed, of Hamilton. Mr. Greed discovered his specimen, a nearly perfect example, in the lower beds at Clifton Bank, Muddy Creek, Hamilton. He presented it to the National Museum on the 3rd March, 1924 (Reg. No. 13273). The fragility of the Muddy Creek specimen makes it surprising that the shell was obtained in so perfect a condition. As it is, however, a portion of the thin shelly flange has developed cracks more or less parallel with the periphery, and portions that came away had to be supported with paper. Other fractures seen in the shell run in zig-zag fashion across these peripheral cracks right through the flange into the dome of the shell. The prevalence of these fractures in the shell and flange seems to suggest that there was an abnormal amount of organic basis in this type of shell, which, on the extraction of the specimen from the stratum gave rise, by rapid drying, to contraction and compensatory rifting.

Detailed Description of Fossil.

The form of the body of the shell is broadly pyriform, roundly contoured anteriorly, and tapering rapidly posteriorly. The profile shows a strong humping of the body of the anterior, with the spire nearly flush with the general shape, comparable with the roundly based *Cypraea sphaerodoma* Tate. The lower surface of the shell is nearly flat, with a gently furrowed or depressed margin on the upper surface, indicating the junction of the body of the shell with the explanate flange. The aperture runs the whole length of the shell, is gently sinuous in the middle, strongly arched towards the anterior, and slightly undulose posteriorly. The usually crenate margin of the aperture is well marked, the teeth becoming obsolete at about one-fifth from either end. Both apertural openings are slightly expanded and tubular. During the

examination of this fragile specimen a portion of the flange, with the surface of the body of the shell, beçame loose, thus revealing a stouter shell layer beneath, over which the thin enamel lay like a glaze.

The length of the shell, from the anterior edge of the flange to the posterior, measured along the apertural region, is 97 mm. The greatest width from side to side is 90 mm. The length of the body whorl, from the centre of the spire at the apex to the base of the body within the siphonal extension, is 56 mm. The greatest width of the body whorl is 52 mm. The greatest height of the shell, measured from the base, is 33 mm.

Cossmann and Vredenburg on Palliocypraea.

Cossmann, in his original descriptions of his subgenus *Palliocypraea,* makes reference to Dr. G. B. Pritchard's specimen from Mornington, which he figures (Cossmann, 1906, pl. ix., figs. 10, 11), as the genotype of "*Rhynchocypraea* (*Palliocypraea*) *gastroplax* McCoy." Pritchard's specimen is really a plesiotype, for the genotype (which can be a name only) is *Cypraea gastroplax* McCoy. This latter is represented by the holotype of the species, in the National Museum (Reg. No. 12140). Cossmann states the age of the Mornington specimens as "Eocene," but both the Mornington and Muddy Creek (Lower) beds are now usually regarded as Oligocene, and certainly not Eocene.

In an exhaustive summary of the Family Cypraeidae, E. Vredenburg (Vredenburg, 1920, pp. 126, 128), refers McCoy's *Cypraea gastroplax* to a section of *Gisortia* under Cossmann's name of *Palliocypraea.* He cites two species—*C. gastroplax* McCoy and *C. mulderi* Tate. From a consideration of the form of the latter shell, however, it appears quite incompatible to associate the two species, for *C. mulderi* has a broadly ovoid contour to the body whorl, and the only approach to a flange is in the depressed and round edged base of the shell.

Morphological Considerations.

In his original description of this cowry McCoy said: "The enormously extended circular thin flange into which the base is extended, renders this cowry totally unlike any previously known living or fossil species." This statement still seems to hold good, and the genus *Palliocypraea* is therefore monotypic. One calls to mind the families of the *Aporrhaidae* and the *Strombidae* in which the outer lip of the body whorl is extended, flattened and fingered, and which extension sometimes involves the entire length of the shell. This extension does not, however, surround the shell, and possibly only in *Cypraea* could this be effected, since in that genus or its allies there is a greatly expanded mantle which covers, or nearly so, the whole body and base of the shell.

In *Trivia* the edges of the mantle do not quite junction, as may be seen in the median dorsal furrow dividing the costate ornament.

The flange in this species has no morphological connection with an expanded lip, as in the genera mentioned, nor with the thin everted lip of an embryo cowry, which in after life becomes introverted and crenulate. The shelly flange is, therefore, an exogenous growth in continuity with the periphery of the shell and was probably the result of using up a redundancy of shell material as a secretion of the basal part of the mantle, which otherwise would have been utilised in adding to the body whorl of this extraordinarily thin cowry shell. The shell flange, moreover, would obviously be advantageous to the cowry in creeping over an even-surfaced oozy sea-bed.

Although we consider it better to regard *Palliocypraca* as worthy of separate generic rank, there is no doubt that the body form shows it to be related to the group often referred to as *Gisortia*. Thus we may cite *C. leptorhyncha*, *C. ampullacea*, *C. eximia* and *C. sphacrodoma* as representative of this type of shell, which, indeed, was already established in Lower and Middle Tertiary times, whilst in *C. umbilicata* we have a survival to the present in Austral seas.

Conditions of Deposition in the Muddy Creek and Balcombe Bay Beds.

The bed at Clifton Bank, where Mr. Greed's discovery of *Palliocypraca gastroplax* was made, is a yellowish, friable shelly sand or marl containing numerous polyzoa and the pteropod, *Vaginella*, together with some foraminifera. The finer muddy portion of the matrix seen in the Balcombe Bay specimen is wanting in the Muddy Creek deposit, but in both localities fairly deep water conditions are indicated by the occurrence of pteropod shells.

The foraminifera of the Balcombe Bay impure limestone add somewhat to the depth estimation of water in that locality in Balcombian times, and this is further substantiated by the prevalence of glauconite grains.

At a rough estimate *Palliocypraca* lived in the Balcombian sea in the Port Phillip area at between 200 and 400 fathoms, whilst in the Muddy Creek (Clifton Bank area) its probable depth would be 100 fathoms or less.

Comparison of the Present Specimen with the Balcombe Bay Holotype.

McCoy's type specimen is stated to come from "the Oligocene Tertiary limestone of the tract between Mount Eliza and Mount Martha on the shores of Hobson's Bay." In explanation we may remark that the precise locality, seeing that the shell occurred in a

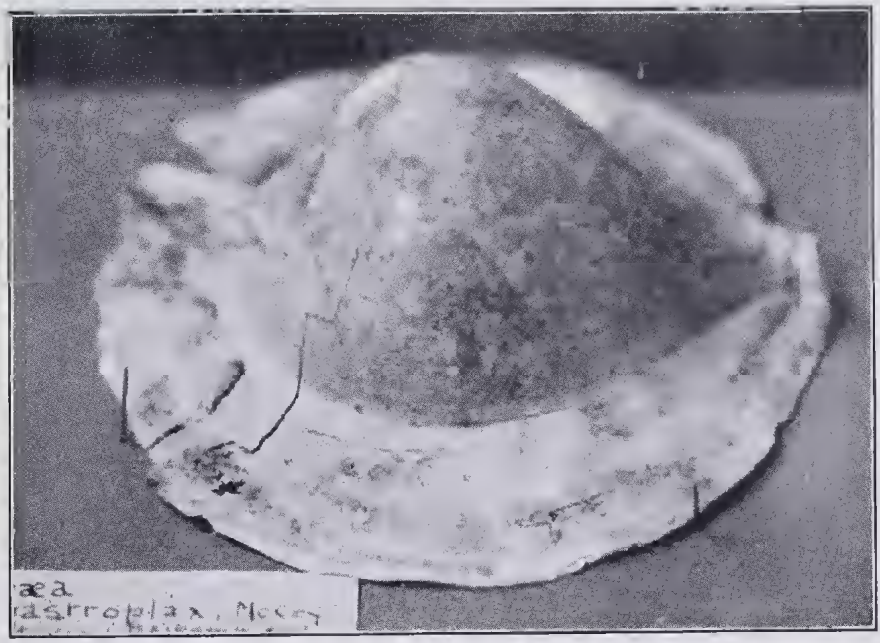

Fig. 1.

F. C. photo.

Fig. 2.

Palliocypraea gastroplax.